



**European Network for  
Environmental Citizenship**  
Cost Action CA16229

*ENEC Report*

## ***New Research Paradigms & Metrics for assessing Environmental Citizenship***



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## New Research Paradigms & Metrics for assessing Environmental Citizenship

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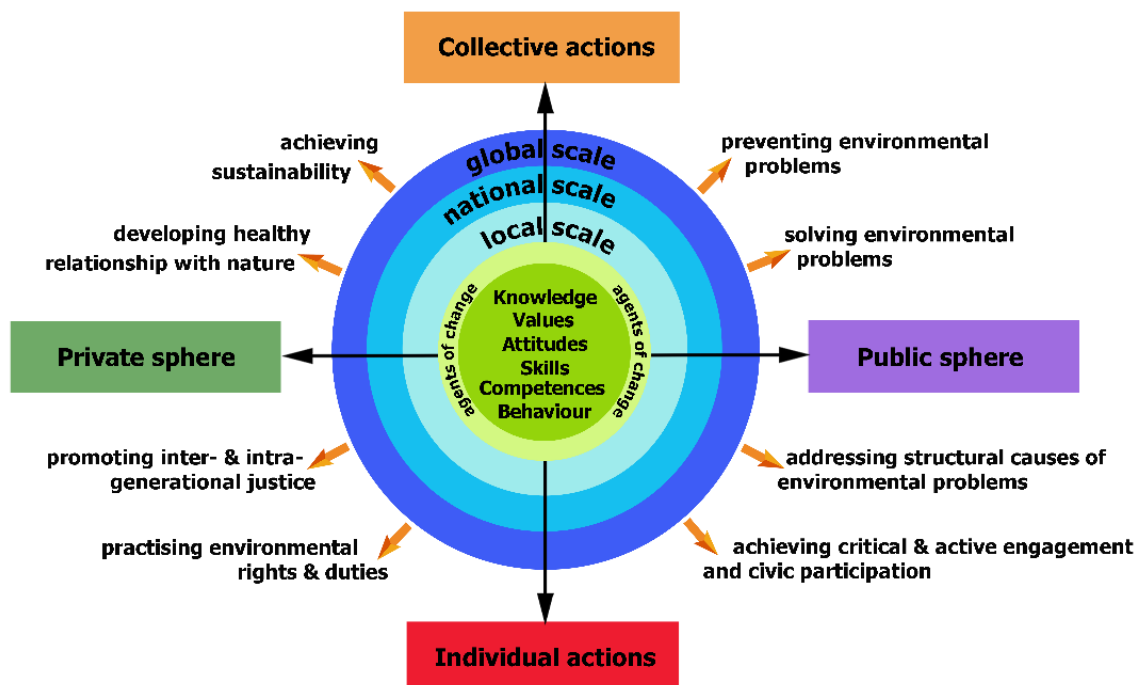
## Developing metrics measuring Environmental Citizenship

The aim of this action is to develop metrics for assessing the concept of Environmental Citizenship. An inventory of what different measurement tools for assessing Knowledge, Skills and Competencies (e.g., Critical Thinking, Creativity, Decision Making), Attitudes, Values (Anthropocentric, Biocentric, Ecocentric, Economic, Societal), Beliefs and Behaviors, and Norms of Environmental Citizenship in the different cultural and contextual settings will be conducted.

Environmental Citizenship is defined as:

*The responsible environmental behaviour of citizens who act and participate in society as agents of change in the private and public sphere, on a local, national and global scale, through individual and collective actions, in the direction of solving contemporary environmental problems, "Environmental Citizenship" includes the exercise of environmental rights and duties, as well as the identification of underlying structural causes of environmental degradation and environmental problems, as well as the development of a sustainable environment, the development of willingness and competences for critical and active engagement and civic participation to address those structural causes, acting individually and collectively within democratic means, and taking into account inter-generational and intergenerational justice (ENEC, 2018a).*

Figure 1. A visualization of Environmental Citizenship



Source: Hadjichambis and Paraskeva-Hadjichambi, 2020

In the ENEC consortium, all the members have been encouraged to record previous established and internationally published research instruments that are of relevance for covering various aspects of Environmental Citizenship as displayed in the definition and visualization of Figure 1. These suggestions have then been presented and discussed within the ENEC network. Here follows the results of these efforts.

## **Research instruments to use for measuring different aspects of Environmental Citizenship**

In the process the following research instruments have been selected and recommended: *Connectedness with nature; Environmental competence; Environmental literacy; Pro-environmental behavior; Self-transcendence and self-enhancement values; Student environmental citizenship; Sustainability Consciousness*

A description of each individual instrument and its relationship to Environmental citizenship follows.

## **1. Connectedness with nature**

### **A. The instrument**

Instrument consists of 24 (full version) or 11 (short version) items. Environmental identity instrument originally was considered to be unidimensional, but some authors (Olivos, P., & Aragonés, J. I. (2011). Psychometric properties of the Environmental Identity Scale (EID). *Psychology*, 2, 65-74. <https://doi.org/10.1174/217119711794394653> ) found support for the four factors solution. In both cases instrument intends to capture one's sense of connectedness to the natural environment. Sample items of the instrument: "I think of myself as a part of nature, not separate from it" or "Being a part of the ecosystem is an important part of who I am".

### **B. The relationship and coverage of aspects of Environmental Citizenship**

Education for Environmental Citizenship theoretical model postulates that one of the important parts of the Environmental citizenship is developing healthy relationship with nature. This instrument can be used for the purposes of evaluating this relationship.

### **C. Publication and further description of the instrument**

Clayton, S. (2003). Environmental identity: A conceptual and an operational definition. In S. Clayton & S. Opatow (Eds.), *Identity and the natural environment* (pp. 45-65). Cambridge, MA: MIT Press. More useful information on the concept of connectedness with nature and instruments that measure it can be found here <https://doi.org/10.1177/2158244019841925>

## **2. Environmental competence**

### **A. The instrument**

The instrument measures six factors: Conscientious, Outdoor Skills, Wayfinding, Knowledge, Practical Skills, and Resource Conservation. Example items that represent each subscale respectively: Avoiding products that harm the environment; Ability to find an alternate route to a destination; Making a space feel home-like; Planning errands to minimize miles driven. A valid and reliable questionnaire scored on a 5-point scale.

### **B. The relationship and coverage of aspects of Environmental Citizenship**

Education for Environmental Citizenship theoretical model postulates that one of the important parts of the Environmental citizenship is competences that would enable environmental citizenship practices. The instrument relates to the oft-forgotten aspects of environmentalism, such as being able to find your way and being mindful about your surroundings. A well-rounded environmental citizen needs these environmental competences.

### **C. Publication and further description of the instrument**

Pedersen, D. M. (1999). Dimensions of environmental competence. *Journal of Environmental Psychology*, 19(3), 303-308. <https://doi.org/10.1006/jevp.1999.0130>

### **3. Environmental literacy**

#### **A. The instruments**

These questionnaires assess of Environmental Literacy (EL); a questionnaire was developed and validated for different age levels: children (upper primary level), youth (secondary level), students in Higher Education (including student teachers), and adults. The tools measure all the dimensions of EL - the *cognitive* dimension (knowledge of ecological concepts and processes foundational for comprehending human impact on natural systems, interrelationships between human and nature, environmental issues and environmental action strategies), the *affective* dimension (values regarding human-nature relations, attitudes concerning general and specific environmental issues, sense of self efficacy and locus of control, assumption of personal responsibility), willingness to act, and *behavioral* dimension - self-reported involvement in environmentally responsible actions. The tool for children also assesses their perception regarding the role of children in caring for the environment and options for children's action.

Some of these tools reflect a mixed methodology approach and incorporate open-ended questions alongside the close-ended items (which is the more widely used approach in quantitative studies). We have found that the open-ended responses may be more sensitive in detecting subtle differences among groups and also enable to gain information regarding the different considerations and thinking underlying dispositions thus providing more rich information.

Regarding the knowledge component, some of these tools also differentiate between objective knowledge (what respondents actually know) and subjective knowledge (what respondents think they know), which are two different constructs. Concerning the relationship between the different EL components and prediction of behavior, we have found that subjective knowledge correlates to behavior and also predicts behavior much more significantly than objective knowledge. This has educational implications.

#### **B. The relationship and coverage of aspects of Environmental Citizenship**

The instruments address all the components of EC as presented in the inner circle of the EC model. They address actions conducted individually in the private sphere and also actions that individuals can conduct in the public sphere. The instruments address the aspect of rights and responsibilities which are specifically identified with citizenship. Environmental Literacy as assessed by these tools refer explicitly to the goals of EC: solving and preventing problems, achieving a healthy & sustainable relationship with non-human nature, active engagement and civic participation.

#### **C. Publication and further description of the instrument**

1. **The tool for children:** Goldman, D., Ayalon, O., Baum, D. & Weiss, B. (2018). Influence of 'Green School Certification' on students' environmental literacy and adoption of



sustainable practice by schools. *Journal of Cleaner Production*, 183: 1300-1313. DOI: 10.1016/j.jclpro.2018.02.176. This tool combines quantitative and qualitative components; differentiates between objective and subjective knowledge; includes exploring children's' perceptions regarding their responsibility in caring for the environment. Regarding behavior it enables to differentiate between involvement in "light" green actions, such as recycling and more upstream actions concerning personal materialistic consumerism. It also explores children's perceptions regarding the contribution of different sources on their environmental engagement

2. **The tool for youth:** Goldman, D., Pe'er, S. & Yavetz, B. (2017). Environmental literacy of youth movement members – is environmentalism a component of their social activism? *Environmental Education Research*, 23(4), 486-514. DOI: 10.1080/13504622.2015.1108390. Regarding behavior, the tool addresses personal materialistic consumerism.
3. **The tool for HE students (and adults):** Alkahr, I. & Goldman, D. (2017). Characterizing the motives and environmental literacy of undergraduate and graduate students who elect environmental programs – A comparison between teaching-oriented and other students. *Environmental Education Research*, 24(7), 969-999. DOI: 10.1080/13504622.2017.1362372. Regarding attitudes, this tool incorporates items reflecting Dobson's attributes of EC. Regarding behavior, it incorporates actions in the public sphere.
4. **The EL tool for student teachers (and adults):** Yavetz, B., Goldman, D. & Pe'er, S. (2009). Environmental literacy of pre-service teachers in Israel: A comparison between students at the onset and end of their studies. *Environmental Education Research*, 15(4), 393-415. DOI:10.1080/13504620902928422 Regarding behavior, factor analysis elicits 6 behavioral categories that reflect increasing commitment to the environment, from actions that are accompanied by a personal financial benefit (and may therefore be conducted for economic reasons) up to citizenships actions (actions conducted for the benefit of society without personal benefits) and public citizen actions in the public sphere. This may contribute to designing tools/items sensitive to identifying increasing citizenship commitment and engagement.

Goldman, D., Yavetz, B. & Pe'er, S. (2006). Environmental literacy in teacher training in Israel: Environmental behavior of new students. *The Journal of Environmental Education* 38(1), 3–22. <https://doi.org/10.3200/JOEE.38.1.3-22>

## **4. Pro-environmental behaviour**

### **A. The instrument**

Instrument measures different types of pro-environmental behavior (PEB) of adults (also can be adjusted to measure adolescents PEB). Instrument consists of six subscales that represent energy conservation, mobility and transportation, waste avoidance, consumerism, recycling as well as vicarious social behaviors toward conservation behavior domains. Further are provided examples of each subscale respectively: " I wait until I have a full load before doing my laundry", "I ride a bicycle or take public transportation to work or school", "I buy products in refillable packages", "I buy seasonal produce", " I collect and recycle used paper", and "I have pointed out unecological behavior to someone". From Q1 to Q32 participants rate the frequency of their engagement in each of the behaviors on a Likert type scale, varying from 1 "never" to 5 "very often". From Q33 to Q50 participants indicate whether they engaged ("Yes") in the certain behavior or not ("No"). There is possibility to choose "NA" option in these cases when behavior is not relevant for participant or are not available in certain context. To measure pro-environmental behavior the original version of the instrument can be used, yet it also possible to use only items that serve the purposes of the study.

### **B. The relationship and coverage of aspects of Environmental Citizenship**

Education for Environmental Citizenship theoretical model postulates that one of the important parts that constitutes the Environmental citizenship is public and private sphere pro-environmental behavior.

### **C. Publication and further description of the instrument**

Kaiser, F. G., & Wilson, M. (2004). Goal-directed conservation behavior: The specific composition of a general performance. *Personality and individual differences*, 36(7), 1531-1544. doi: <http://dx.doi.org/10.1016/j.paid.2003.06.003>

## **5. Self-transcendence and self-enhancement values**

### **A. The instrument**

Instrument that consists of 16 items measures four values that are relevant in explaining environmental behaviors. Biospheric and altruistic values represent self-transcendence values, while egoistic and hedonic values represent self-enhancement values. Further are provided examples of each values subscale respectively: "RESPECTING THE EARTH: harmony with other species", "EQUALITY: equal opportunity for all", "SOCIAL POWER: control over others, dominance" and "PLEASURE: joy, gratification of desires". Participants rate in a nine-point scale varying from -1 to 7, to what extent they think certain values is a guiding principle of his/her life. It has been stated that biospheric and altruistic values are most relevant in explaining environmental behavior, yet empirical evidence exists that indicates that some people can conserve environments for egoistic or hedonic reasons.

### **B. The relationship and coverage of aspects of Environmental Citizenship**

Education for Environmental Citizenship theoretical model postulates that one of the important parts that constitutes the conceptual are values.

### **C. Publication and further description of the instrument**

Created by Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values?. *Journal of social issues*, 50(4), 19-45. doi: <http://dx.doi.org/10.1111/j.1540-4560.1994.tb01196.x> developed by Steg, L., Perlaviciute, G., Van der Werff, E., & Lurvink, J. (2014). The significance of hedonic values for environmentally relevant attitudes, preferences, and actions. *Environment and behavior*, 46(2), 163-192. doi: <https://doi.org/10.1177/0013916512454730>

## **6. Student Environmental Citizenship**

### **A. The instrument**

This instrument measures the citizenship aspect of Environmental citizenship. The items are extracted from the *International Civic and Citizenship Education Study (ICCS)*, which is a cross sectional study repeatedly asked in 38 countries in 2009, 24 countries in 2016, and forthcoming about 30 countries in 2022. The student questionnaire is adopted for 8th graders in most countries (average age 14 years old). Here is a link for the instrument: <https://www.iea.nl/studies/iea/iccs>.

### **B. The relationship and coverage of aspects of Environmental Citizenship**

The instrument is part of the large scale international civic and citizenship education study but the items, fits only partially the ENEC definition of environmental citizenship including knowledge, values, attitudes and actions. The following items are recommended items for measuring Environmental Citizenship specifically: Students' responses to questions "Have you ever been involved in activities?" and "How important are actions for a good adult citizen?" (lowest 1 to highest 3 or 4 ). items: 1) Have been involved in an environmental action group or organization (Q15); 2) At school, participating in an activity to make the school more environmentally friendly (Q16); 3) At school, have learned how to protect the environment (Q18); 4) Important for a good adult citizen to take part in activities to protect the environment (Q23); 5) Important for a good adult citizen of to make personal efforts to protect natural resources (Q23).

### **C. Publication and further description of the instrument**

Cheah, S. L., & Huang, L. (2019). Environmental Citizenship in a Nordic Civic and Citizenship Education Context . *Nordic Journal of Comparative and International Education (NJCIE)*, 3(1), 88-104. <https://doi.org/10.7577/njcie.3268>

## **7. Sustainability Consciousness**

### **A. The instrument**

The questionnaire instrument measures knowingness (the recognition of the importance of a sustainable development), attitudes (the attitudes towards sustainable development) and self-reported behavior (the willingness to act towards a sustainable development) related to the three pillar model of sustainable development dimensions (environment, economy and society). The instrument exists in two versions; a long and a short. The long version (SCQ-L, 49 items) can be used to measure individuals' environmental, social and economic knowingness, attitudes and behaviour (nine valid and reliable subscales). The short version (SCQ-S, 27 items) can be used to measure the second order constructs of sustainability knowingness, sustainability attitudes and sustainability behaviour, as well as the third order construct, sustainability consciousness. The questionnaire was developed to match the UNESCO definition of sustainable development, and the items of the questionnaire correspond to this definition

### **B. The relationship and coverage of aspects of Environmental Citizenship**

The instrument includes items covering the three dimensions of sustainability; environment, economy and society. Each item also reflects either Knowledge, attitudes and behavior (see the inner circle of the EC-model in Figure 1. Sustainability Consciousness explicitly refer to these goals of Environmental Citizenship: *achieving sustainability, preventing environmental problems, solving environmental problems, addressing structural causes of environmental degradation, promoting intra- and inter-generational justice, achieving critical and active engagement & civic participation*. The sustainability Consciousness questionnaire investigates *individual actions* predominately in the *private sphere*, although also to some degree in the *public sphere*.

### **C. Publication and further description of the instrument**

Gericke, N., Boeve-de Pauw, J., Berglund, T. & Olsson, D. (2019). The Sustainability Consciousness Questionnaire: The theoretical development and empirical validation of an evaluation instrument for stakeholders working with sustainable development. *Sustainable Development*, 27(1), 35–49. <https://doi.org/10.1002/sd.1859>

## 8. Environmental Citizenship Questionnaire (ECQ)

### New metric

In the ENEC Cost Action (CA16229) a new metric was newly developed to assess students' Environmental citizenship. Here follows a description of this metric:

### A. The instrument

The Environmental Citizenship Questionnaire (ECQ) was developed based on the EEC model (Figure 1) which presents the structure of the concept of Education for Environmental Citizenship (ENEC, 2018b). ECQ measures students' environmental citizenship and focuses in 9 factors: Past and present actions as ECn, Knowledge for EC, Conceptions for EC, Skills of Ecn, Attitudes of Ecn, Values of Ecn, Future actions inside school, Future actions outside school, and Future actions as agents of change.

The source of items and their focus area are presented in Table 1.

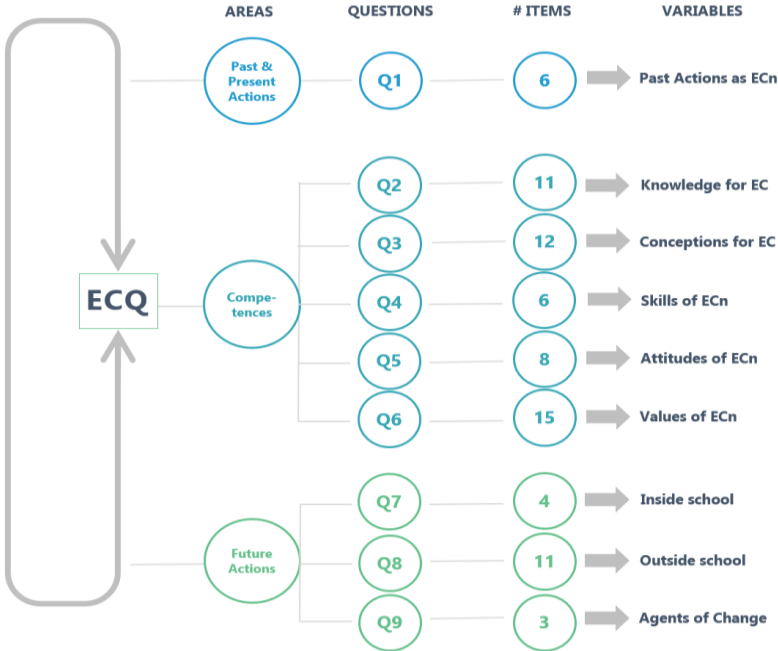
**Table 1.** The source of items and their focus area.

Question	Focus area	Source of the question and adjustments
1	Past and present actions as Ecn	Modified from ICCS, Student Questionnaire, Schulz et al. [21], Q15
2	Knowledge for EC	Developed based on EEC Model, Hadjichambis and Paraskeva-Hadjichambi [14]
3	Conceptions for EC	Modified from ICCS, Student Questionnaire, Schulz et al. [21], Q23
4	Skills of Ecn	Modified from ICCS, Student Questionnaire, Schulz et al. [21], Q29
5	Attitudes of Ecn	Adopted from "The Sustainability Consciousness Questionnaire", Gericke et al. [23]
6	Values of Ecn	Adopted from "The Environmental Portrait Value Questionnaire", Bouman et al. [22]
7	Future actions inside school	Modified from ICCS, Student Questionnaire, Schulz et al. [21], Q30
8	Future actions outside school	Modified from ICCS, Student Questionnaire, Schulz et al. [21], Q32
9	Future actions as agents of change	Developed based on EEC Model, Hadjichambis and Paraskeva-Hadjichambi [14]

The ECQ can be used to assess environmental citizenship in different contexts but also to evaluate educational interventions if this validated tool is implemented before and after an educational intervention or an environmental education programme. Some of the authors' results of another study can support this claim but these results are out of the scope of this current study. It may also provide feedback on which environmental citizenship factors have been differentiated and which should be given greater emphasis and attention. In addition, the ECQ can be used to compare results from different contexts, regions and countries, different teaching practices (e.g., participatory action research, community-based learning) and in different types of education (e.g., formal, non-formal). In this case, of course, its effectiveness should be tested in different contexts, regions and countries and with different age groups, with possible modifications that might be needed.

**B. The relationship and coverage of aspects of Environmental Citizenship**

ECQ contains 76 items (Appendix A) representing three different areas related to environmental citizenship (EC) (Figure 4). The first area involved *Past and Present Actions* (Q1) that are undertaken as environmental citizens (ECn). In this area, six items were included. The second area was related to *Competences* of environmental citizens such as knowledge about environmental citizenship (Q2: 11 items), conceptions for environmental citizenship (Q3: 12 items), skills of environmental citizen (Q4: 6 items), attitudes of environmental citizen (Q5: 8 items) and, finally, values of environmental citizen (Q6: 15 items). These 52 items correspond to the core of the EEC model where the green cycle is situated, to the eight outcomes (orange arrows) and to the three different scales (local, national, global). The last area is related to *Future Actions* as environmental citizen: inside school (4 items), outside school (11 items) and as an agent of change (Q9: 3 items). Behaviour, which is mentioned in the green cycle, is linked to Q7–Q9.



**Figure 4.** The ECQ structure.

Questions 7 and 8 of the area of Future Actions correspond to different individual and collective actions in private and public spheres which are symbolized with the four rectangles of the EEC model. In Table 2 can be found the items that refer to past and present or future actions (Q1, Q7, Q8 and Q9) and how they correspond to the private and public spheres, as well as to individual and collective dimensions. Each of those actions can be implemented into the three scales (local, national, global).

**Table 2.** Classification of items related to actions in dimensions and spheres.

	<b>Individual Dimension</b>	<b>Collective Dimension</b>
<b>Private Sphere</b>	1a, 1b, 1c, 1g, 8a, 8b, 8h, 8i	/
<b>Public Sphere</b>	1e, 1f, 7b, 7c, 8d, 8e, 8g, 9a, 9b, 9c	7a, 7d, 8c, 8f, 8j, 8k

**C. Publication and further description of the instrument**

Hadjichambis, A. Ch.; Paraskeva-Hadjichambi, D. Environmental Citizenship Questionnaire (ECQ): The Development and Validation of an Evaluation Instrument for Secondary School Students. *Sustainability* **2020**, *12*(3), 821. <https://doi.org/10.3390/su12030821>



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